B.V. SKVORTZOV* and Mitsuzo NODA**: *Euglena* species with one or two chromatophores recorded from South America and South Africa in 1962-1966

ビー，ブイ，スクボルツォフ*・野田光蔵**：南米および南阿から得られた色素体1，2個を有するユーグレナの種類

The senior author studying flagellata in São Paulo, Brasil spent several years in taxonomy of the genus *Euglena* Ehr. and on the way to Brasil visiting Durban of South Africa collected several samples which were cultivated in Cryptogamic Laboratory of Botanical Institute in São Paulo, Brasil. Here are given the key and the description with figures only of species of *Euglena* with one or two chromatophores. Altogether 15 species are described, 10 of which are proposed as new species. To 9 new Euglenas found in Brasil have been given different feminine names used by South American Indians, as arai, irai, iari and others. If you take a map of Brasil or of the city São Paulo, you will find hundreds of Indian name used at present.

Here is given a list of localities where samples had been collected and studied.

1. Parque do Estado de São Paulo, in stagnis temporaria, lg. B. Skvortzov, 14, 6. '65.
2. ibid, 14, 7. '65.
3. ibid, in excrementis equinis, 14, 4. '66.
4. ibid, inter *Salvinia* sp., 8, 6. '65.
5. ibid, inter *Salvinia* sp., 23, 5. '66.
6. ibid, in silva montanis in cavernulae arborum, 14, 5. '65.
7. ibid, in stagnis permanentis, 13, 5. '65.
8. ibid, in stagnis cum *Majacca* sp., 16, 7. '65.
9. ibid, in stagnis permanentis, 13, 7. '65.
10. São Paulo, prope Eldorado in lacu cum aqua impura, lg. B. Skvortzov, 7, 5. '65.
11. ibid, in aqua impura inter plantas aquaticis, 6, 5. '65.

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12. ibid, 7, 6. '65.
13. ibid, 6, 3. '63.
14. São Paulo, prope Cipo, in rivulis montanis inter plantas aquaticis, lg. B. Skvortzov et V. Alin, 20, 6. '63.
15. ibid, inter *Salvinia auriculata*, lg. V. Alin, 14, 4. '66.
16. São Paulo, rio Tamatabe, in aqua impura, lg. B. Skvortzov, 10, 4. '66.
17. ibid, in fossa, 10, 4. '66.
18. Estado de São Paulo, Serra de Mar, inter muscis terrestris prope rivulis montanis, lg. B. Skvortzov, 30, 6. '65.
19. Estado de São Paulo, prope Ubatula, lg. Prof. Daniel M. Vital, 13, 4. '63.
20. Estado de Sap Paulo, prope Sao Jose, in aqua impura cum *Lemna* sp., lg. Prof. Samuel Branco et B. Skvortzov, 13, 2. '64.
21. São Paulo, Horto Florestal, in lacu artificialis montanis, lg. B. Skvortzov, 10, 5. '65.
22. ibid, in lacu, 22, 6. '65.
23. São Paulo, prope Sao Caetano de Sul, in stagnis inter *Spirogyra* sp., lg. B. Skvortzov, 23, 5. '65.
24. São Paulo, Avenida Washington Louis, in lacu montanis artificialis, lg. B. Skvortzov, 23, 5. '65.
25. São Paulo, prope S. Amaru, inter *Sphagnum* sp. montanis stagnalis, lg. V. Alin, 24, 5. '65.
26. Africa australis, prope oppidum Durban, in stagnis, in Horto Botanico inter *Salvinia* sp., lg. B. Skvortzov, 6, 9. '62.

Two species of *Euglena* were described from Durban-*Euglena durbanica* sp. nov. and *Euglena araci* sp. nov. The last one was also recorded from three places in Brasil.

This report was prepared in Cryptogamic Section of Botanical Institute, São Paulo, Brasil and here the authors express their gratitude to the Director of the Botanical Institute Dr. Alcides Ribeiro Teixera and the leaders of the Cryptogamical Section Dr. Oswaldo Fidalgo, Dr. Joao Salvador Furtado, Dr. Carlos Eduardo de Mattos Bicudo for permission to make the research work and to Mr. V. Alin and Prof. Daniel M. Vital for collecting samples used for the present study.

The type specimens are preserved at the Cryptogamic Section of Botanical Institute, São Paulo, Brasil.

1. Chromatophore one 2

1. 1 Chromatophores two.. 9

2. Pyrenoids not present 3

2. 2 Pyrenoids present 7

3. Chromatophore laminate.. 4

3. 3 Chromatophore parietal 5

4. Cells ovoid to fusiform, anterior part rounded, posterior short acute; paramylum granules small or large ....1. *Euglena arai* sp. nov.

4. 4 Cells fusiform or clavate, anterior part attenuate ....2. *E. irai* sp. nov.

5. Paramylum granules annulate ....3. *E. iara* sp. nov.

5. 5 Paramylum granules not annulate 6

6. Cells ovate, oviod, fusiform, more or less acute in the posterior end...4. *E. iraci* sp. nov.

6. 6 Cells ovate, rounded in the posterior end ....5. *E. jandira* sp. nov.

7. Pyrenoids 2, necked, chromatophore parietal..............6. *E. araci* sp. nov.

7. 7 Pyrenoid 1, surrounded by starch grains 8

8. Cells oblong or fusiform ....7. *E. ahi* sp. nov.

8. 8 Cells ovoid or fusiform, anterior part acute, posterior broad rounded or attenuate ....8. *E. durbanica* sp. nov.

9. Chromatophores 2, one in the upper part, another in the lower part of the cell...9. *E. jacira* sp. nov.

9. 9 Chromatophores 2, laminate and marginal 10

10. Pyrenoids not present 11

10. 10 Pyrenoids present 12

11. Cells fusiform with more or less obtuse ends ......10. *E. von-Goori* Defl. f.

11. 11 Cells spherical, ovoid or oblong with rounded or acute end 13

12. Cells spherical, ovoid or oblong, posterior end round ....11. *E. bichloris* Schiller

12. 12 Cells oblong, posterior end short acute ....12. *E. nana* Johnson

13. Pyrenoids 2, necked, chromatophores laminate and marginal...13. *E. juraci* sp. nov.

13. 13 Pyrenoids 2 with starch granules not necked 14

14. Chromatophore parietal, cells ovate, broad ellipsoid with more or less rounded ends... 14. *E. archaeoplastidiata* Chadef.

14. 14 Chromatophores 2, laminate and marginal; cells short fusiform, the posterior end more or less acute............................15. *E. pisciformis* Klebs

1. **Euglena arai** sp. nov. (Figs. 1-5)

Cellula elongata, ovata, obovata vel fusiformis, in metabolica sphaerica, cum apicibus plusminusve attenuatis, parte anteriore interdum elongato sine flagellum brevi acutis, 15-26×7-8 micr.; periplasto hyalino et non striata; chromatophor laminatus cum marginibus convolutis et saepe lobatis; flagellum fere cellulae longius vel nullum; vacuola contractilis sphaerica; stigma parte anteriore magna, rubra et oblonga; nucleus magnus parte anteriore vel posteriore; granulis paramylaceis ovalibus. A *Euglena virida* Play (Godsics, 1953, pl. 6 fig. 3) cellulis sine pyrenoidum differt. Hab. 1, 10, 14, 24, 25.

2. **Euglena irai** sp. nov. (Figs. 6-9)

Cellula fusiformis cum apicibus attenuatis, 26-40-50×6-12 micr.; flagellum nullum; stigma oblonga et major et distincta; gula oblonga et conspicua; chromatophor 1 et laminatus, convolutis et viridis, sine pyrenoide; nucleus contralis; granulis paramylaceis ellipsoideis vel ovalis et numerousis. Differt a *Euglena virida* Play (Hüber-Pestalozzi, 1955, 105-106, Abb. 105-106) et *E. cingala* Gods. (1953, pl. 6 fig. 4) in apicibus cellulis nulto attenuatis et sine pyrenoidibus. Hab. 2, 14.

3. **Euglena iara** sp. nov. (Fig. 10)

Cellula late elliptica vel subovala cum apicibus rotundatis, 18-30×15-20 micr.; periplasto spiraliter striata, striis sinistrorso-dextrorsum; flagellum 1.5 cellula longius; vacuola contractilis magna et rotundata cum stigma rubra fere rotundata; nucleus magnus sphaericus et posteriore; granulae paramylaceis annulatae, numerosi in parte medianae cellulae; pyrenoidum nullum. Differt a *Euglena archaeoplastidiata* Chad. in cellulis sine pyrenoides. Hab. 3.

4. **Euglena iraci** sp. nov. (Figs. 11-15)

Cellula subsphaerica, ovata, ovoidea, late fusiformis, parte anteriore oblique nasuta, parte posteriore brevi acuta, 18.5-23-33×11-15-18 micr.; periplasto hyalino et metabolica indistincte striato; chromatophor parietalis, viridis sine pyrenoidum cum granulis paramylaceis ovalis, late-ellipsoidies vel bacillariformis et numerosis; flagellum fere cellula longius; vacuola contractilis orbicularis; nucleus parte posteriore cellulae; interdum granulis haematochromi adsunt. Hab. 4, 5, 16, 17, 18.

5. **Euglena jandira** sp. nov. (Fig. 16)

Cellula ovalis, parte anteriore plusminusve acuta, parte posteriore late rotundata, 18.5×14 micr.; membrana distincta, hyalina et non striata; flagellum 1/2 cellula longius; stigma magna rubra et suborbicularis; gula prope stigma; chroma-

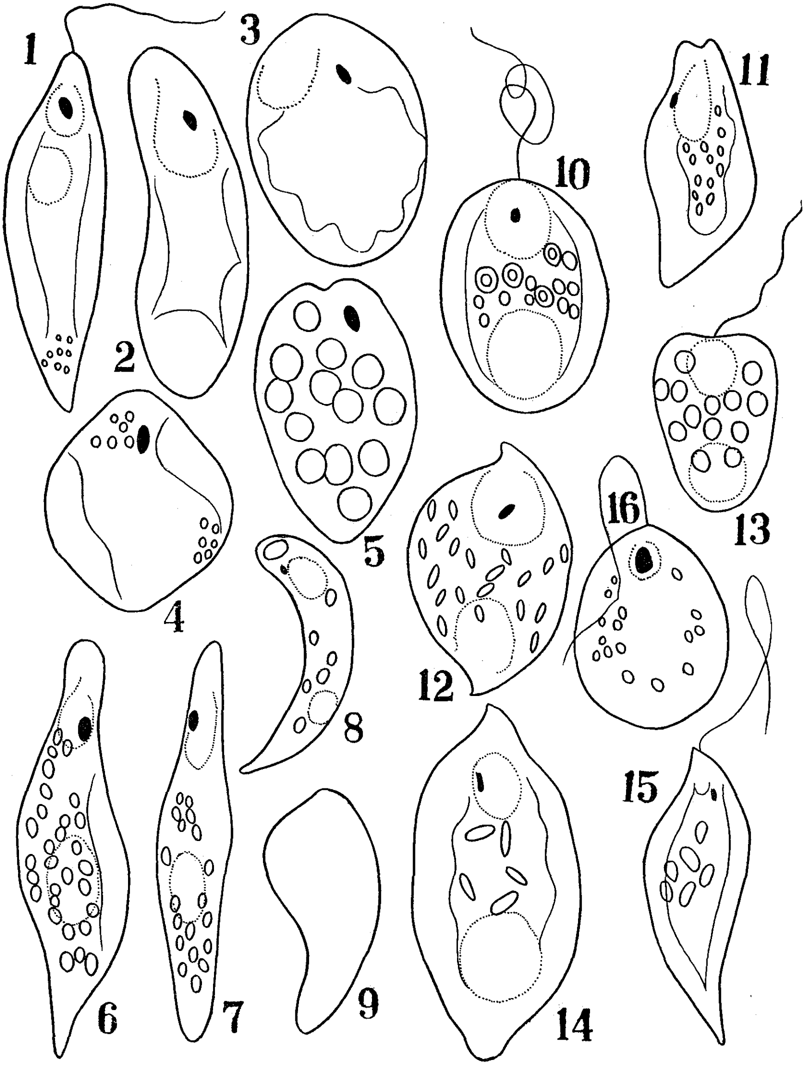

Fig. 1-5. *Euglena arai* sp. nov. 6-9. *E. irai* sp. nov. 10. *E. iara* sp. nov. 11-15. *E. iraci* sp. nov. 16. *E. jandira* sp. nov.

tophor viridis parietalis et sine pyrenoide cum granulis paramylaceis numerosis sphaericis vel ovalis; nucleus centralis vel posterioris. Differt a *Euglena iraci* in parte posteriore rotundatis. Hab. 11.

6. **Euglena araci** sp. nov. (Figs. 17-19)

Cellula fusiformis cum apicibus acutis; parte anteriore oblique vel multo elongata, 22-26×10 micr.; chromatophor parietalis, viridis cum 2 pyrenoide levis vel nudae sine granulis paramylaceis; flagellum 2/3 cellula longius; vacuola contractilis magna et orbicularis; stigma oblonga et rubra; nucleus fere centralis vel posterior. A *Euglena virida* Play (Godsics, 1953, pls. 6, 8) chromatophoris parietalis et non laminatis differt. Hab. 10, 15, 19, 24.

7. **Euglena ahi** sp. nov. (Fig. 20)

Cellula fusiformis vel elongata, parte anteriore late rotundata, parte posteriore brevi acutis, 33×11 micr.; periplasto hyalino et non striata; chromatophor 1 laminatus, viridis cum pyrenoidum unum rotundatum cum granulis paramylaceis; vacuola contractilis oblonga et magna; flagellum et stigma non vidi; nucleus parte posteriore cellulae. A *Euglena singula* Gods. (1953, pls. 6 fig. 4) pyrenoidum unum differt. Hab. 7.

8. **Euglena durbanica** sp. nov. (Figs. 21-24)

Cellula ovalis vel fusiformis, parte anteriore plusminusve acuta, parte posteriore late rotundata vel plusminusve brevior acuta, 18-37×6-8 micr; flagellum nullum vel 1/2 cellula longius; stigma rubra suborbicularis prope gula magna insertis; chromatophor parietalis viridis cum pyrenoidum angulatum cum granulis paramylaceis in parte posteriore cellulae positae; nucleus inter pyrenoidum et parte posteriore cellulae; granulis paramylaceis magnis et ovalibus. Hab. 24.

9. **Euglena jacira** sp. nov. (Fig. 25)

Cellula elongata vel subcylindrica, parte anteriore plusminusve rotundatis, parte posteriore brevi acutis, 30×11 micr.; flagellum fere cellula longiora; stigma elongata et distincta; chromatophoris 2, supra et infra medianis quindque cum pyrenoide complexae et cum granulis paramylaceis; nucleus centralis. Differt a *Euglena bivitata* Conrad (Gods. pl. 1 fig. 3) minor et in marginibus non parallelis. Hab. 23.

10. **Euglena von-Goori** Defl. forma (Fig. 26) *E. von Goori* Defl., Hüber-Pestalozzi (1955) 42, Abb. 16 a, b; Godsics (1953) pl. 1 fig. 4.

Cellula fusiformis cum apicibus obtusis, 33×15 micr.; periplasto hyalino et non striato; chromatophoris 2 viridibus, laminatis et laterales, sine pyrenoidum; flagellum et nucleus non vidi; vacuola contractilis rotundata et magna; stigma

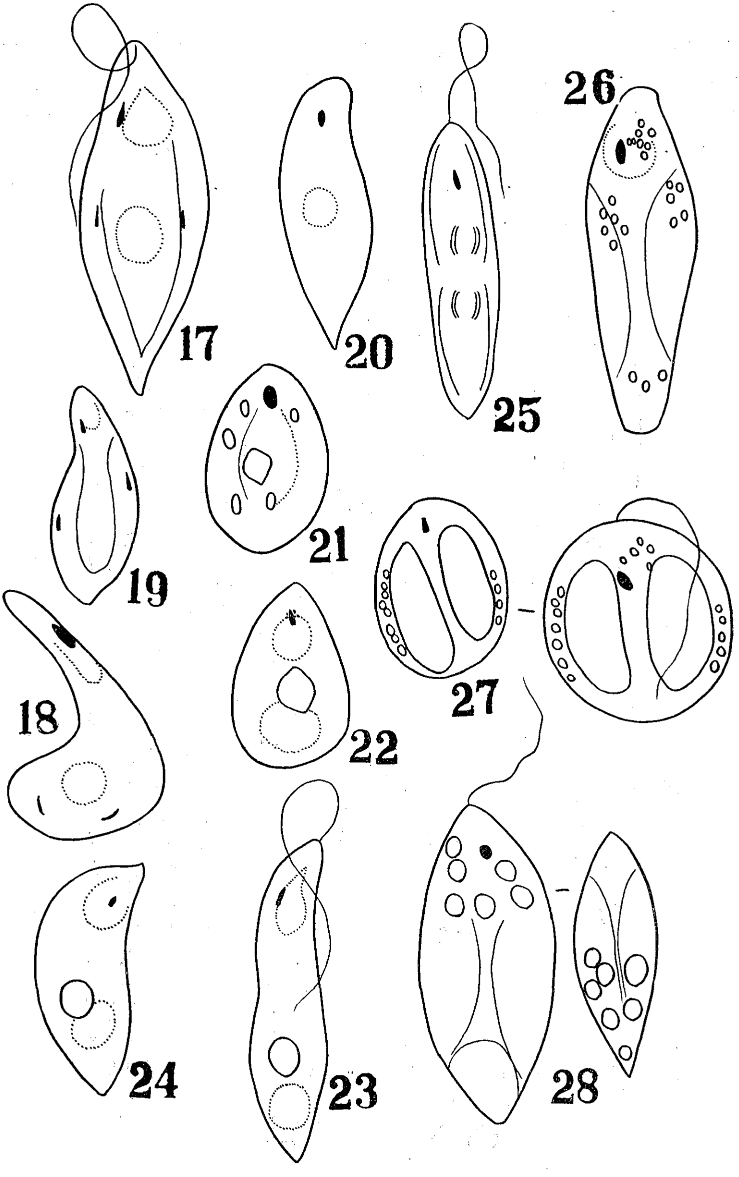

Fig. 17-19. *Euglena araci* sp. nov. (fig. 17-18 from Brasil, fig. 19 from Durban) 20. *E. ahi* sp. nov. 21-24. *E. durbanica* sp. nov. 25. *E. jacira* sp. nov. 26. *E. von Goori* Defl. fo. 27. *E. bichloris* Schiller 28. *E. nana* Johnson

oblonga et rubra; granulis paramylaceis rotundatis et non ellipsoides. A *Euglena von Goori* granulis paramylaceis rotundatis et non ellipsoideis differt. Hab. 11, 20.

11. **Euglena bichloris** Schiller (Fig. 27) Hüber-Pestalozzi (1954) Abb. 91.

Cells spherical, ovoid or oblong with both ends more or less rounded, 18-33×15-18 micr.; periplast more or less hyaline and not striated; chromatophores 2 laminate without pyrenoids; flagella about the cell length; eyespot oblong and red; contractile vacuole indistinct; nucleus about central and sometimes lateral. Hab. 8, 12.

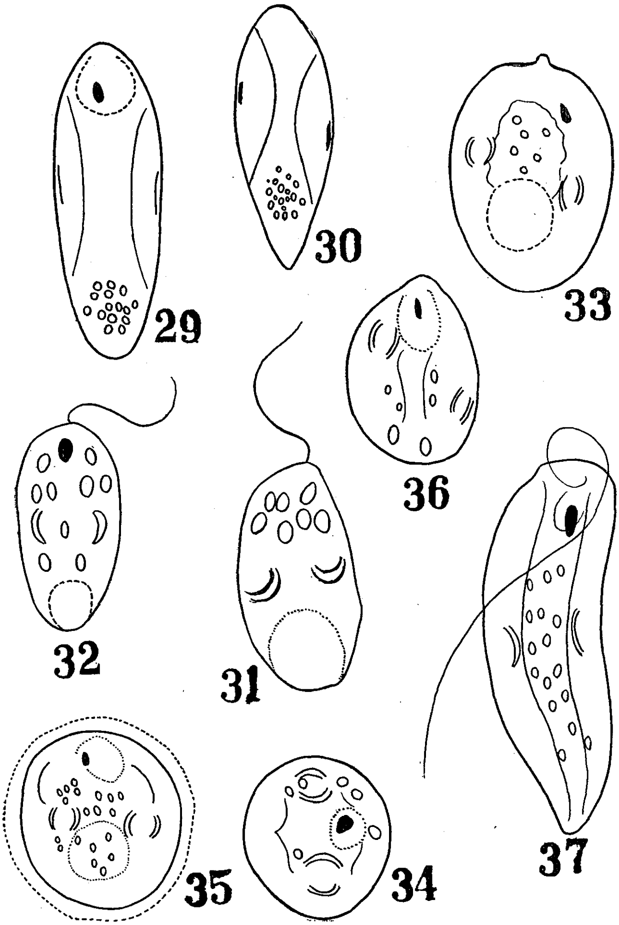

Fig. 29-30. *Euglena juraci* sp. nov. 31-36. *E. archaeoplastidiata* Chad. (fig. 31-35 from Brasil, fig. 36 from Durban) 37. *E. pisciformis* Klebs

12. **Euglena nana** Johnson (Fig. 28) Godsics (1953) pl. 6 fig. 5.

Cells fusiform or subspherical with both ends more or less acute, 18-20×8-12 micr.; periplast thin and hyaline; flagellum about 1/2 of the cell length; eyespot large and round; nucleus posterior; chromatophores green, lateral without pyrenoids; paramylum granules large, round or ellipsoid in anterior part of the cell. Different from the type in presence of a large round eyespot and large round paramylum granules near the reservoir. Hab. 22.

13. **Euglena juraci** sp. nov. (Figs. 29-30)

Cellula fusiformis cum apicibus plusminus breviter acutis, 22-26×7-9 micr.; periplasto hyalino et non striato; chromatophoris 2 laminatis, lateralis et viridis quindque cum duas pyrenoidibus nudo; flagellum 1/2 cellula longius; vacuola contractilis indistincta; nucleus magnus et posterior; granulis paramylaceis ellipticis vel bacillariformis. Differt a *Euglena pisciformis* Klebs pyrenoidibus nudis. Hab. 22.

14. **Euglena archaeoplastidicata** Chad. (Figs. 31-36 (fig. 36 ex Durban)) Hüber-Pestalozzi (1955, 116-117, Abb. 90); Godsics (1953, pl. 6 fig. 1).

Cells ovate or oblong with more or less rounded ends, 15-20×8-10 micr.; periplast hyaline and not striated; chromatophores parietal with 2 sheated pyrenoids; contractile vacuole in anterior part; paramylum granules oval and numerous; nucleus posterior. Different from the type in hyaline periplast. Hab. 9.

15. **Euglena pisciformis** Klebs (Fig. 37) Hüber-Pestalozzi (1955, 41 Abb.); *E. agilis* Carter 1856 in Godsics (1953) pl. 1 fig. 3 a-c.

Cells fusiform with acute both ends, 20×8 micr.; 2 chromatophores lateral each with bisheated pyrenoid; flagellum about cell length; eyespot large, red and ovoid; nucleus in the lower part of the cell; paramylum granules numerous, small in form of round bodies and oval. Hab. 9, 16.

Literature

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南米ブラジル São Paulo および南阿 Natal の海港 Durban から採集した色素体1, 2個を有するユーグレナ属 (*Euglena*) の15種について記載, 図示した。そのうち10種は新種である。